AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently Amended) A method for tracking an object in an image using Fast Fourier Transforms, comprising the steps of:

identifying a background correction term for a Fast Fourier Transform correlation tracker; and

tracking the object based on a representation of the background correction term that includes ~~the~~ a frequency domain sinc function.

Claim 2 (Currently Amended) The method of Claim 1, wherein the step of tracking comprises the steps of:

zero-padding a reference window to a size of a search window, performing a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and taking a complex conjugate of the transformed zero-padded reference window;

performing a 2 dimension Fast Fourier Transform of a search window;

performing a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window, and multiplying the result by a first factor to obtain a first result in the frequency domain;

squaring pixel values of the search window and performing a 2 dimension Fast Fourier Transform of the squared pixel values into the frequency domain;

multiplying the transform of the squared pixel values with a sinc function to obtain a second result in the frequency domain;

summing the first and second results to form a third result in the frequency domain;

performing a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searching for a minimum of the correlation surface.

Claim 3 (Original) The method of Claim 2, wherein the first factor is -2.

Claim 4 (Original) The method of Claim 2, wherein the sinc function is a 2 dimension sinc function.

Claim 5 (Original) The method of Claim 4, wherein the sinc function is pre-stored.

Claim 6 (Original) The method of Claim 2, wherein in the step of searching for a minimum of the correlation surface, border areas which have edge effect caused by window operation, are excluded.

Claim 7 (Currently Amended) The method of Claim 1, wherein the step of tracking comprises the steps of:

zero-padding a reference window to a size of a search window, performing a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and taking a complex conjugate of the transformed zero-padded reference window;

performing a 2 dimension Fast Fourier Transform of a search window;

performing a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window, and multiplying the result by a first factor to obtain a first result in the frequency domain;

obtaining a search window function by squaring pixel values of the search window;

performing a 2 dimension Fast Fourier Transform of the search window function into the frequency domain;

multiplying the transform of the search window function with a sinc function to obtain a second result in the frequency domain;

summing the first and second results to form a third result in the frequency domain;

performing a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searching for a minimum of the correlation surface.

Claim 8 (Original) A method for tracking an object in an image using Fast Fourier Transforms, comprising the steps of:

transforming non-constant terms of a mean-square-error correlation function from the spatial domain into the frequency domain, wherein one of the non-constant terms is a background correction term and the frequency domain representation of the background correction term includes the 2-dimension sinc function;

computing the non-constant terms in the frequency domain;

transforming the computed non-constant terms from the frequency domain to the spatial domain to obtain a correlation surface;

and evaluating the correlation surface in the spatial domain to find a minimum on the correlation surface, where the location of the minimum corresponds to a location of the object in the image.

Claim 9 (Currently Amended) A method for tracking an object in an image using the first and third terms of a mean-square-error function *C(s,t)* defined as having three terms, wherein the first term is a background correction term, the method comprising the steps of:

transforming the first and third terms into the frequency domain;

computing the first term in realtime using ~~the~~ a 2-dimension sinc function;

computing the third term;

transforming the computed first and third terms out of the frequency domain to form a correlation surface; and

determining a minimum of the correlation surface, wherein a location of the minimum corresponds to a location of the object being tracked.

Claim 10 (Original) The method of Claim 9, wherein the mean-square-error function *C(s,t)* is defined as

$$C(s,t) = \frac{1}{N}\sum_{N} f^2(x,y) + \frac{1}{N}\sum_{N} g^2(x-s,y-t) - 2\cdot\frac{1}{N}\sum_{N}[f(x,y)\cdot g(x-s,y-t)]$$

wherein the first term is

$$\frac{1}{N}\sum_{N} f^2(x,y)$$

and wherein the third term is

$$-2\cdot\frac{1}{N}\sum_{N}[f(x,y)\cdot g(x-s,y-t)].$$

Claim 11 (Currently Amended) A Fast Fourier Transform correlation tracker, comprising:

a computing device with inputs for receiving an input search window image and receiving a reference window image, wherein the computing device tracks the reference window image in the input search window image based on a frequency domain background correction term that includes ~~the~~ a 2 dimension sinc function.

Claim 12 (Currently Amended) The tracker of Claim 11, wherein the ~~tracker~~ tracker:

zero-pads a reference window to a size of a search window, performs a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and takes a complex conjugate of the transformed zero-padded reference window;

performs a 2 dimension Fast Fourier Transform of a search window;

performs a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window, and ~~multiplying~~ multiplies the result by a first factor to obtain a first result in the frequency domain;

squares pixel values of the search window and performs a 2 dimension Fast Fourier Transform of the squared pixel values into the frequency domain;

multiplies the transform of the squared pixel values with a sinc function to obtain a second result in the frequency domain;

sums the first and second results to form a third result in the frequency domain;

performs a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searches for a minimum of the correlation surface.

Claim 13 (Currently Amended) The tracker of Claim 11, wherein the ~~tracker~~ tracker:

zero-pads a reference window to a size of a search window, performs a 2 dimension Fast Fourier Transform of the zero-padded reference window into the frequency domain, and takes a complex conjugate of the transformed zero-padded reference window;

performs a 2 dimension Fast Fourier Transform of a search window;

performs a complex multiplication of the complex conjugate of the transformed zero-padded reference window and the transformed search window,

and ~~multiplying~~ multiplies the result by a first factor to obtain a first result in the frequency domain;

obtains a search window function by squaring pixel values of the search window;

performs a 2 dimension Fast Fourier Transform of the search window function into the frequency domain;

multiplies the transform of the search window function with a sinc function to obtain a second result in the frequency domain;

sums the first and second results to form a third result in the frequency domain;

performs a 2 dimension inverse Fast Fourier Transform of the third result to obtain a spatial-domain correlation surface; and

searches for a minimum of the correlation surface.